

CLAIMS

What is claimed is:

1. A method for illuminating a target for optical lithography, the method comprising:

5 a) providing a photomask including:

 i) a transparent substrate having first and second surfaces on opposite sides of said substrate, said second surface facing said target;

 ii) a first mask pattern on said first surface;

10 and

 iii) a second mask pattern on said second surface;

 b) transmitting an incident light through said first mask pattern to form a propagation pattern at said second
15 surface; and

 c) transmitting light from said propagation pattern through said second mask pattern to form a target pattern on said target.

2. The method of claim 1, wherein a critical dimension in
20 said target pattern is less than about 0.5 microns.

3. The method of claim 1, wherein said first mask pattern comprises an opaque material.

4. The method of claim 3, wherein said opaque material comprises amorphous silicon, chromium or iron oxide.
5. The method of claim 1, wherein said first mask pattern comprises a transparent material.
- 5 6. The method of claim 6, wherein said transparent material comprises MgF_2 , CaF_2 , lithium niobate, silicon nitride, quartz or glass.
7. The method of claim 1, wherein said second mask pattern comprises an opaque material.
- 10 8. The method of claim 7, wherein said opaque material comprises amorphous silicon, chromium or iron oxide.
9. The method of claim 1, wherein said second mask pattern comprises a transparent material.
10. The method of claim 9, wherein said transparent
- 15 material comprises MgF_2 , CaF_2 , lithium niobate, silicon nitride, quartz or glass.
11. The method of claim 1, wherein said substrate comprises glass.
12. The method of claim 1, wherein said substrate has a
- 20 thickness separating said first and second surfaces in a range from about 0.3 mm to about 5 mm.

13. The method of claim 1, wherein said propagation pattern comprises a double slit optical diffraction pattern.

14. The method of claim 1, wherein said propagation pattern comprises an Airy disk optical diffraction pattern.

5 15. The method of claim 1, wherein said propagation pattern comprises a single edge optical diffraction pattern.

16. The method of claim 1, wherein said propagation pattern comprises a monotonic optical intensity distribution.

17. The method of claim 1, wherein said incident light is
10 substantially at a single wavelength.

18. The method of claim 1, wherein said incident light is substantially at a plurality of wavelengths.

19. The method of claim 1, wherein said incident light comprises light at substantially a continuous range of
15 wavelengths.

20. The method of claim 1, wherein said second mask pattern is in proximity to said target.